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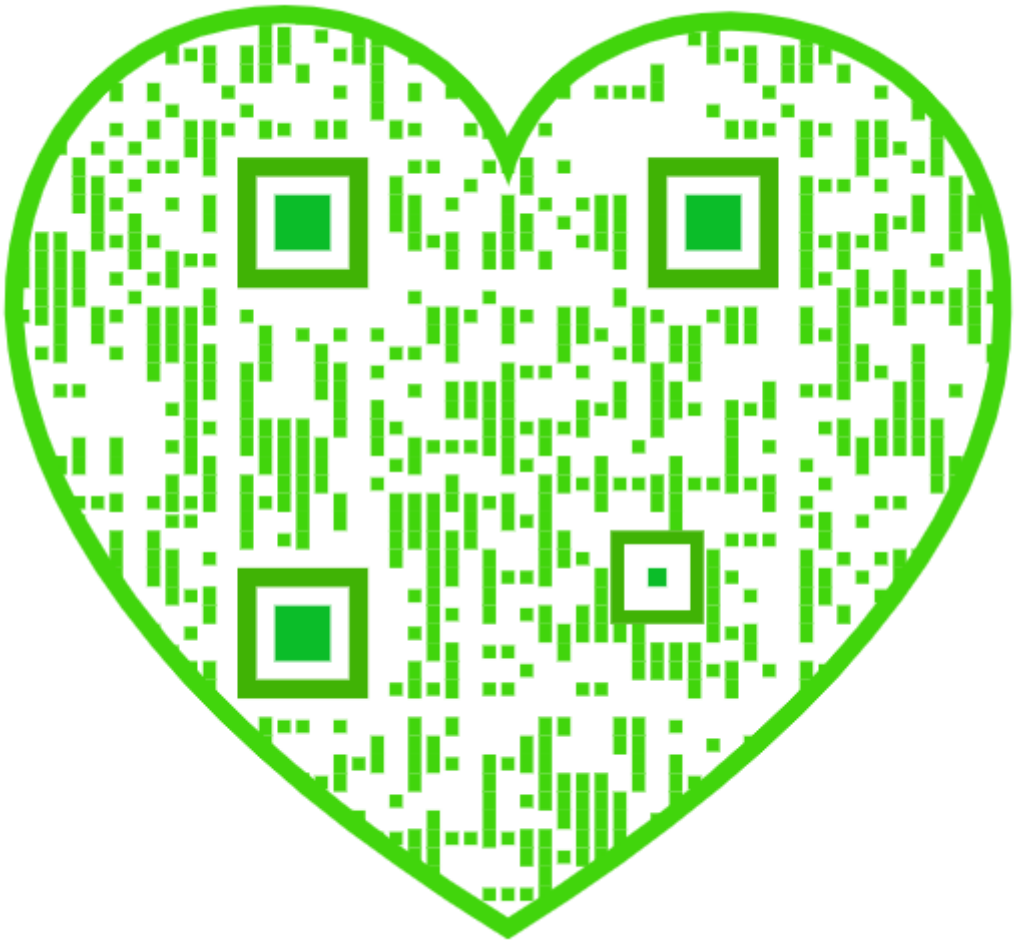

PROGRESSIVE SHEEP RAISING

GIFT
SEP 3 1918

Lambs ready for market.

PROGRESSIVE SHEEP RAISING

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AGRICULTURAL RESEARCH AND ECONOMICS

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Introduction

By F. Edson White
Vice President of Armour and Company

THE sheep, as a domesticated animal, is closely bound with the great movements of world commerce during the past hundred years. The history of sheep raising reflects the remarkably rapid development of commerce and industry during the nineteenth century, in which the founders of the packing industry took part.

The old Wool Type of Sheep

Less than a century ago mutton was little used outside the densely populated districts of the Old World. In the Americas, Africa, Australia and Central Asia—remote regions where transportation was poor and land was cheap and sparsely populated—there was no market for mutton and sheep were raised for skins and fleeces only. For the production of these, the Merino was the ideal type, and it had the field all to itself.

Up to as late as 1870 four-fifths of all the sheep in America were either pure-bred or grade Merinos. During the following twenty years, however, several developments of world-wide significance took place which changed the aspect of the world's sheep-raising industry.

When Mutton Superseded Wool

Railroad building and steamboat operation, along with the practical application of large-scale refrigeration and the refrigerator car, annihilated time and distance between the sheep ranges and the centers of world meat consumption so that the sheep grower for the first time found himself face to face with the strong and steady pull of a world demand for mutton as well as wool and skins.

Sheep growers began crossing their wool-growing type of sheep with the various mutton types of Europe.

How Philip D. Armour Broadened the Market

Not until 1869 was the first through-line railroad opened up between Chicago and New York, so that cars of western meats or other goods could be shipped through to eastern markets without reloading.

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In 1875 Philip D. Armour erected in Chicago the first really large-scale chill room in the world, although small ice boxes, and even a crude type of refrigerator cars, had previously been used by others.

Previous to 1880 Mr. Armour, who was also responsible for the actual building and operation of the first whole line of refrigerator cars, killed no sheep in his several packing plants. Pork was the ideal packing meat, as it still is; and fresh meats had not yet become a commodity on the market. In fact, packing houses were operated only during the winter months, and no meats at all were packed in summer until after large-scale refrigerative control had been established.

The Mutton Market Developed Last

Beef—pickled, smoked and dried—followed pork as a commodity on the market. The world's appetite for fresh meats was satisfied only insofar as home slaughter and the local butcher could satisfy it. But mutton, being strictly a fresh meat product, and not lending itself to pickling, smoking and drying, became a world commodity only after the development of refrigerated transportation.

In 1880 Mr. Armour began killing a few sheep in Chicago to supply the local market. The large-scale slaughter and distribution of sheep in the new world had to await not only the development of a great line of refrigerator cars and scores of branch houses, but the development of the public taste for mutton and a mutton type of sheep to satisfy that growing taste.

The Present Armour Market

The first Armour branch house was erected in New York City in 1884. This was immediately followed by one in Albany. By 1890 there were forty branches, and this number had doubled before 1894.

Today the market through which Armour disposes of the vast number of high-grade lambs and sheep purchased annually for cash from the American farmer consists of more than four hundred branch houses in this country alone. Several thousand refrigerator cars are constantly in operation between the twenty Armour packing plants and these hundreds of branch houses.

A great system of side industries has been developed to utilize all of the by-products, in the manufacture and sale of such articles as glue, glycerine, violin strings, pepsin and fertilizer, which enables us to pay the sheep raiser a maximum price for his live animals.

Armour's Farm Service Bureau

This book has been prepared under the auspices of Armour's Farm Service Bureau, which has been organized to study the whole Armour system of industries in their relation to farm production, to serve as a middle-ground of information and co-operation between the several Armour industries and the farmer and to make researches into problems of farm production.

It is our hope that this bureau will fulfill a useful mission in establishing a closer understanding and co-operation between the producer and the packer in particular; but also, in a broader sense, between the farmer and the business man, and between business and our educational institutions.

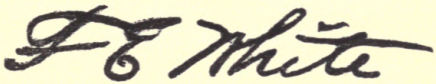


Table of Contents

	PAGE
INTRODUCTION, by F. Edson White	3
THE SHEEP SITUATION TODAY	9
Why Sheep Went West	9
The Present Eastward Trend	10
Increased Importance of Sheep	11
The Opportunity	11
The Breeder Safe	12
Relation of Breeder and Feeder	12
The Sheep Market	12
Prospects for Prices	13
THE SHEEP IN FARM ECONOMY	14
The Ranch Vanishing	14
The Farm the Place for Sheep	14
Relation to Weeds and Waste	14
Value of Sheep Manure	15
RAISE SHEEP FOR MEAT	17
Wool Supply Follows Mutton	17
Should We Sell Lambs	17
A Lamb Market Necessary	18
Should Encourage Lamb Consumption	18
BREEDS AND BREEDING	20
Secure Breeding Stock	20
Breeding Ewes	20
Renew Stock with Pure Bred Ram	21
General Classification of Breeds	21
Types of the Different Breeds	22
Fine Wool vs. Mutton Breeds	23

PAGE
Cross Breeding..... 23
In the Mating Season..... 24
During Pregnancy..... 24
Suggestions for Lambing Time..... 24
A First Aid Outfit..... 25
Caring for the Ewe..... 25
Caring for the Lamb..... 25

MARKETING MUTTON AND LAMB..... 26
What Are the Market Demands..... 26
Early Spring or Hot-House Lambs..... 26
Spring Lambs..... 26
Fed Lambs..... 27
Imported Sheep and Lambs..... 28

THE FEEDING OF SHEEP..... 29
Feeding Ewes..... 29
At Lambing Time..... 29
Begin Feeding at Ten Days..... 30
Healthy Lambs Economize Feeds..... 30
Feeding for Breeders or for Market..... 31
Gains From Different Grains..... 31
Rations Worked Out by Experiment Stations..... 31
Rations for Fattening Lambs..... 32
Calculating Feeding Costs..... 33
How to Fatten Sheep..... 34
Substitute Barley for Wheat..... 35
The Wool Pays the Feed Bill..... 36
Self Feeders Should Not be Used..... 36

GOOD PASTURES A BASIC CROP..... 37
Good Pastures Important..... 38
Value of Native Grass..... 38

PAGE
Rye, Good and Easy to Grow 38
Vetch and Rye 38
Alfalfa and Oats 39
The Clovers 39
Do Not Graze Clover too Young 39
Rape and Cabbage as Feeds 40
Trees in Pasture 40

GENERAL CARE AND MANAGEMENT 41

Care of Sheep 41
Culling the Flock 41
Shearing 42
Docking of Lambs 42
Castration of Lambs 43
Dogs a Great Hindrance 43
Why Not Have Dog Laws 44
A Uniform Dog Law 44
Sheep Husbandry 45

DISEASES OF SHEEP 46

Sheep Diseases Classified 46
External Diseases 46
Stomach Worms 47
Nodular Disease 47
Treating Internal Diseases 47
Dipping 48
Avoid Bloating 48

By-Products of the Sheep 49
Table of Receipts at Seven Markets 51
Table Showing Range of Lamb Prices 51
List of Officers of the Various Sheep Breeders' Associations 52
References 54

Poor pastures should not and need not be tolerated, but this form of inefficiency is far too common.
See page 37.

Hand-shearing is the old-fashioned method. The clipping is less uniform than by mechanical means and there is more or less nipping of the skin. See page 42.

Progressive Sheep Raising

By R. J. H. DeLoach, Director
Armour's Bureau of Agricultural Research and Economics

The Sheep Situation Today

THE year 1915 marked a new era in the American Sheep industry. It was then that the national movement was started for putting sheep back on our American farms.

Why Sheep Went West

For many years prior to that time the drift of the sheep raising industry in this country had been toward the great free ranges of the far west. Grazing lands with an abundance of wild grasses were plentiful and the cost of raising sheep under such conditions was abnormally low, from the viewpoint of a trained economist who insists upon assigning to everything—even wild pasture land—its true economic value, and the grasses gleaned from them were not represented in the prices of the sheep which came from them to the mid-west and eastern markets.

Meanwhile the improved and cultivated lands of the eastern states were rapidly increasing in value. The owners specialized more and more upon the crops which yielded the best returns and against which there was no abnormal competition from the west. Consequently, grain, vegetables, hogs and dairying became more prevalent and the sheep population dwindled in proportion.

Present Eastward Trend

There are still great areas of these free ranges. It is economy and in the public interest that they should be fully utilized. In fact, more attention should be given to this than ever before. In 1916 our public lands suitable for grazing amounted to about 750,000,000 acres and supported 1,750,000 cattle and 7,850,000 sheep.

However, that condition is passing and will soon go the way of the Buffalo and the Longhorn Steer. The increasing population of the country and the decreasing acreage of these ranges, due to settlement, have combined in recent years to take up some of the slack and force a closer grazing, which makes it necessary to use more and more concentrates to finish range sheep for market. These conditions are gradually bringing up the cost of range sheep until now, under favorable conditions, sheep can be raised and finished for market on the farm almost as cheaply as on the ranges.

The farmers who settle this land will, of course, continue to raise sheep on it, but it will be on a basis similar to that of the small farmer in the East. The cost of raising these sheep will never again be so low as it was on the free range.

The high prices of mutton and wool, suddenly sharpened by the world war, were no doubt responsible for the awakening of the farmers to this change in the economic situation with regard to sheep raising and the resulting nation-wide movement to get our farm lands re-stocked with sheep.

We are now beginning to learn for the first time what the sheep really stands for. We are beginning to appreciate it as a national asset. Of all meat animals it may be that the sheep will eventually prove the most indispensable. Lamb meat already stands at the top—and wool has

no equal as a fiber for the manufacture of clothing. Adequate substitutes may yet be found for leather and other by-products of meat animals, but there is little likelihood of our ever finding a suitable substitute for wool.

Increased Importance of Sheep

The Army had to be clothed as well as fed. Wool was the best if not the only material out of which suitable clothing could be made, and it required the wool of twenty sheep to outfit each soldier. This combination of circumstances has created a world-wide interest in the sheep industry, marking, as we say above, a new era in the American industry and giving impetus to the backward swing of the sheep population from the free ranges of our far west to the thousands of mid-west and eastern farms from which they had formerly disappeared.

The Opportunity

Those who think of entering the business of sheep breeding naturally ask themselves, what are the chances for a permanent sheep and wool market? Such a question is fully justified. The following news item is quoted from the United States Food Administration in February, 1918:

"It is probable that Europe for many years after the war will look to a great extent to America for its meat supply.

"Europe's herds are dwindling under war's demands faster than they can be replenished.

"When the German armies retired from occupied portions of France and Belgium approximately 1,800,000 head of cattle were appropriated. This addition virtually safeguarded Germany from the cattle shortage other nations now suffer."

While sheep are not specifically mentioned in this report, yet the decline in all kinds of livestock has a direct bearing on any branch of the industry. Besides there is a world shortage of sheep amounting to many million head.

The Breeder Safe

In these days of high priced wool and mutton, sheep breeders have reaped large benefits. They have had good pastures and the natural wastes of the farms or the ranches, and have made money almost without exception. This is borne out by personal interviews with many of the best breeders in the country.

The Relation of Breeder and Feeder

Each year hundreds of breeders find themselves with more sheep than they have provided feeds for, and find it expedient to send a part of the flock to market before it is finished. At the same time hundreds of feeders with a surplus of feeds have found it both convenient and profitable to buy up these flocks and finish them for a later market. This is a safe and legitimate operation if conducted with calm judgment.

Within the past few months (written March, 1918) a number of farmers have bought good light lambs at high prices, finished them on costly feeds and put them on the market, making fair money in most cases, breaking about even in some, and actually losing money in a few. This has caused some confusion and misunderstanding, but it has been due to an unfortunate combination of circumstances, which will sometimes happen in any business.

The Sheep Market

We have every reason to believe that there is a world shortage of sheep, in which event the market is safe for several years to come. Whatever conditions may be brought about by the present war, we can feel assured that the law of supply and demand will always regulate prices, which in turn regulates the planting of crops and the breeding of meat animals. This world shortage of sheep has helped to stimulate the industry, and popularize the raising of mutton and lamb and, we feel

justified in saying, has provided a broad and firm foundation for the industry as a business venture.

Prospects for Prices

We feel safe in saying that the prices of mutton and wool will remain high for several years after the war closes. Since the war began our standards of living have continued to go steadily higher, and the scale of values all along the line has advanced. We anticipate a greater demand for meat after the war than ever before, due to the fact that thousands of young men who have not been accustomed to a regular meat diet are being educated to expect it while in the army, and will not be inclined to do without it when they return to their respective homes.

The Sheep In Farm Economy

The Ranch Vanishing

Much of the public land in the west is being opened up for settlement from year to year, and the area for grazing large flocks of low priced sheep is gradually diminishing in this way.

The Farm the Place for Sheep

America's great opportunity is in placing sheep back on farm lands. This insures a public interest in the industry and a permanent supply of sheep and wool. Sheep respond readily to man's care and keeping and are economical on the small farm. They pay a good dividend on the investment, and will be a comfort to every farmer who takes the time to succeed with them.

We are convinced that every American farm should have a flock of sheep on it, the number in the flock to be determined by the size and nature of the farm.

From the standpoint of national economy the sheep should be regarded as a farm necessity the same as poultry and hogs. It is only then that we shall develop a wholesome sheep industry on our farm lands.

Relation to Weeds and Waste

It has been learned by carefully planned experiments that sheep will eat and thrive on about ninety percent of all the species of weeds and grasses growing on the average farm. They clean out the weeds by keeping them cut down to the ground. They also help to eliminate waste by consuming the surplus of forage of all kinds, and make a good medium through which the surplus grain and other concentrates can be marketed with profit. There is a greater profit feeding these to sheep than there is in selling them.

In the first place, the sheep will make good use of the feeds and help to make quick returns. In the second place, the small farmer is obliged to market such feeds generally in small quantities. They are not standardized, and under such conditions only about seventy-five percent of their value is realized.

Value of Sheep Manure

We very seldom put the proper valuation on sheep in their relation to soil fertility. Each sheep will void about four to five pounds of manure daily—making more than two tons daily from a flock of a thousand.

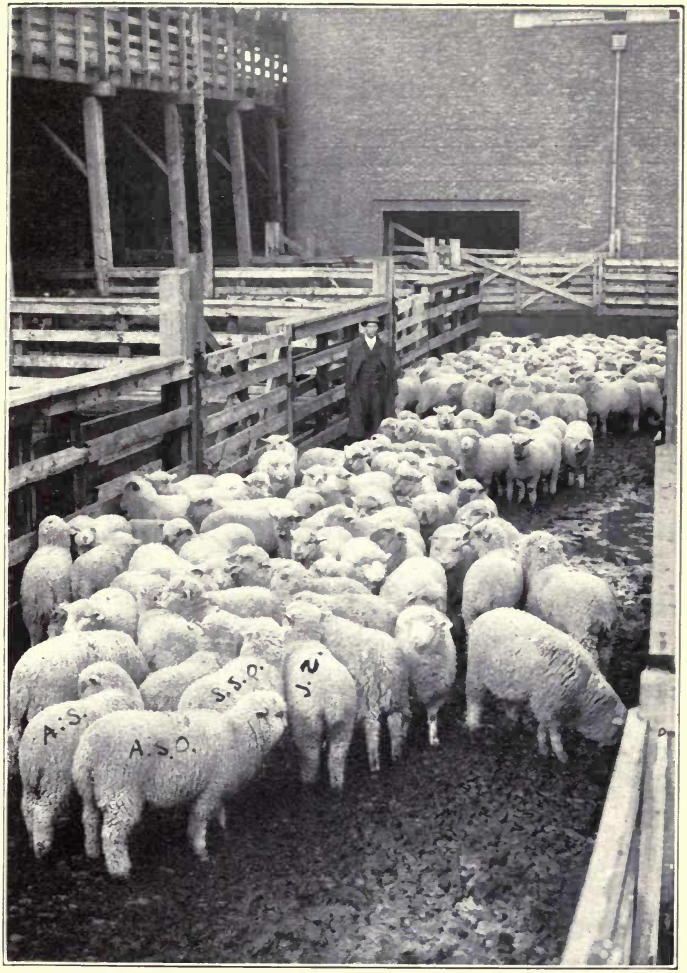
Sheep manure stands high when compared with that of the horse or cow. It contains far more plant food. Voorhees says in his book on fertilizers, that "sheep manure contains less water, and is richer in the fertilizing constituents than either horse or cow manure." The following table shows the relative value by giving the number of pounds of plant food in a ton of each:

	Cow	Horse	Sheep
Nitrogens	7.6	10.6	16.6
Potash	3.2	5.6	13.4
Phosphoric Acid	7.2	10.6	4.6
Juice	6.2	4.2	6.6
Total	24.2	31.0	41.2

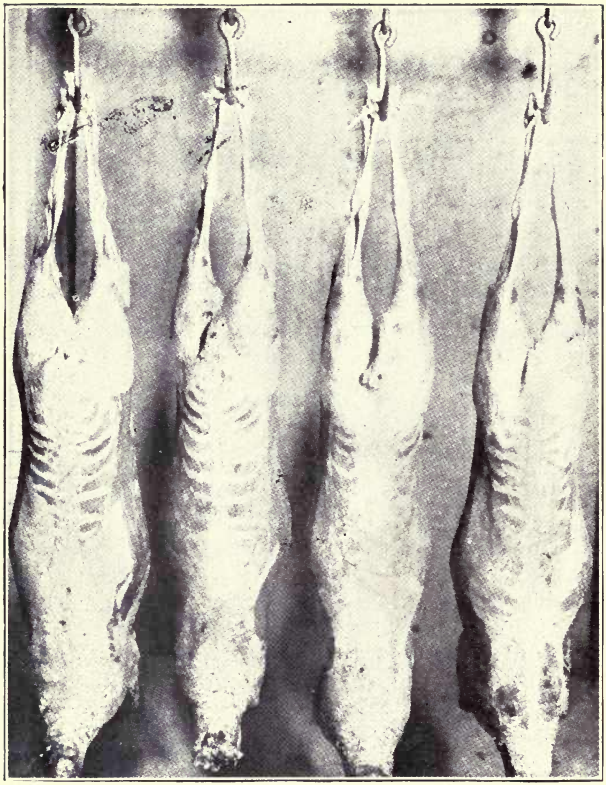
From this table it will be seen that a ton of sheep manure has a total of seventeen pounds of plant food more than a ton of that of the cow, and 10.2 pounds more than a ton of that of the horse.

Every farmer knows how valuable animal manures are in the production of large crops. The actual plant food contained in them constitutes the measure of their value. And on this basis sheep manure is the richest of all.

In Europe sheep are considered a matter of so much importance in the maintenance of soil fertility, that the flock is hurdled in movable pens several nights on plowed ground prior to the time of planting, and the shepherd is up through the night disturbing the flock from time to time in order to secure the greatest possible amount of manure.



A load of Western Range Lambs in Union Stock Yards, Chicago.



"Choice" "Good" "Medium" "Common"

LAMBS AS THE BUTCHER SEES THEM.

Reprinted from "Market Classes and Grades of Meat," Illinois Bulletin No. 147.

Raise Sheep for Meat

THE raising of sheep for wool alone is a thing of the past in this country and in most other countries of the world. It certainly is uneconomical on the valuable farm lands of agricultural districts, where the sheep-raising industry of the future must justify itself. England faced this problem from the first and all English sheep are raised for both mutton and wool.

Wool Supply Follows Mutton

A sheep raising industry for wool alone could hardly exist under modern conditions in the United States. Experience has shown that where we raise sheep for wool alone we will not long have either meat or wool, for the industry will dwindle or die out; whereas if we raise them for the meat primarily we find them to be a cheap source of meat, and the industry becomes profitable and self-perpetuating and we have an abundance of both meat and wool.

It is estimated by the Secretary of Agriculture that the number of sheep in this country could be increased one hundred and fifty percent without displacing other live-stock, and this could be done largely on farm lands.

We import an average of three hundred million pounds of wool annually into the United States, or about half of our total normal consumption. It seems that we should be growing most of that here on our American farms.

Should We Sell Lambs

The impression seems to prevail in this country that in Great Britain the custom is to eat mutton and save the lambs, while in the United States the tendency has been to kill off lambs which might better have been kept to produce more wool and a heavier yield of meat at maturity.

This impression, however, is a mistaken one. The English eat more lamb and less mutton than is generally supposed, most of their lamb being imported from Australia, New Zealand and Argentina.

Great Britain still consumes a smaller proportion of lamb than the United States, but the proportion of lambs to aged stock was steadily growing up to the time of the war.

Statistics show that both Australia and New Zealand, up to August, 1914, were greatly increasing their lamb shipments to Great Britain at the expense of "aged" mutton, and it is our belief that in the future, lamb shipments will develop a still greater predominance.

Furthermore, there are economic considerations which justify the farmer or rancher in sending lambs to market, rather than endeavoring to save all of them for mature weight and one or more shearings of wool before killing.

A Lamb Market Necessary

The average sheep raiser must find a market for his lambs, keeping back only enough ewe lambs to replenish his breeding flock. This is on account of the cost of feeding them through the winter. He would, of course, get a shearing of wool off lambs carried over, which would fully compensate him for the cost of the feed. And there would be a gain in the weight of each animal so held. But when he took them to market he would have "aged sheep" and not "lambs" and the falling off in price per pound would more than offset the gain in number of pounds.

Should Encourage Lamb Consumption

This has all been figured out by breeders again and again, and they find it more profitable and therefore best for the perpetuity of the sheep raising industry, that surplus lambs be sent to market and that the public taste for lamb be catered to rather than discouraged as being unpatriotic and wasteful.

Well bred lambs mature quickly if properly cared for, and command a higher price in this country per hundredweight than mutton. We feel that it is safer to have a lamb-and-mutton market than to have only a mutton market.

Breeds and Breeding

MANY farmers wish to go into the sheep industry to a limited extent, but do not know where to secure breeding stock. We would suggest that a flock of twenty-five to fifty ewes be purchased from any good reliable breeder or from the market places, and a registered ram be put with them. Lambs should not be bred under an age of about eighteen months. Only the best flocks should be patronized in securing these rams, and the advice of experts should be sought. Usually the best breeders advertise in The American Sheep Breeder, The National Wool Grower and other good livestock journals and reference can be had here for breeders. The sheep breeder will do well to subscribe for one or more good live-stock journals. It would be well to write to the Secretary of the national association of the breed you wish, who will always gladly give information. A list of such secretaries is given at the end of this booklet.

Secure Breeding Stock

Many times it will be found economical and profitable to buy these ewe lambs in the open market. This is frequently done and with success.

Breeding Ewes

It does not pay, however, except when they are bought in car lots (about 125 animals to make a single-deck car), and shipped out of the Yards immediately. Several farmers can jointly take a car and have them properly selected by commission men who will, for a small commission, see that they are forwarded as soon as the order can be filled.

In some cases a number of farmers have sent a representative to the Stock Yards to select sheep. When this is done, the services and suggestions of the commission men can be secured just the same.

It will be found that everybody around the Stock Yards is interested and ready to co-operate in placing suitable

young lambs on farms. They feel that the success of the industry depends on this, and are glad to see an effort made to grow more sheep.

Where it is practical, it pays for the farmer to buy breeding stock from his neighbor, in order to save freight and to avoid accidents and loss. This is done to a considerable extent where farmers have neighbors who wish to sell small numbers of sheep, but even in such cases it must be kept in mind that the range sheep are usually healthier than natives and besides, native ewes are apt to be infested with internal parasites. From whatever source the breeding ewes come, it is better to get a registered ram of superior breeding from some breeder of blooded stock.

Renew Stock with Pure Bred Ram

It is necessary to buy a good ram every second or third year for every forty ewes in the flock. New blood in the flock will insure a larger percent of healthy lambs, and will also help in improving the flock. Select a good ram of the type or breed you are keeping. Do not permit breeders to put culls off on you. Any keeper will soon learn what are the characteristics of a good ram.

In Circular Number 42, Louisiana State College, we have a very concise and at the same time rather complete statement regarding breeds and classification of sheep. It is so complete that we give it in part below:

General Classification of Breeds

"With the exception of the Merinos, most, if not all, of the pure-bred sheep in this country are representatives of the numerous breeds of British origin. The British breeds are classified in various ways, such as horned and hornless, dark-faced and white-faced, mountain and lowland, long-wooled and short-wooled; but according to the best of the British authorities, the most usual plan is to divide them into mountain breeds, long-wooled breeds, and down breeds.

As in most classifications, however, it is difficult to draw sharp lines, although the three classes just mentioned are fairly distinct. There is much variation in the sheep of Great Britain, but in all of them, over there, the carcass is the chief consideration.

Types of the Different Breeds

"If we include the Merino, another classification divides sheep into three main classes, from the standpoint of their wool, viz.: long-wools, represented by the Lincoln, Cotswold, Leicester, etc.; middle or medium-wools, represented by the Shropshire, Southdown, Hampshire, etc., known as down breeds; and fine-wools, to which the different varieties of the Merino belong, such as the Rambouillet, Delaine and American. However, although fairly good mutton may be had from any of the breeds of sheep, the middle wool class is that from which the choicest quality is obtained and, therefore, is known as the mutton type. It includes the various down sheep just mentioned, and the Horned Dorset, Cheviot, etc.

"The long-wool breeds are also used as mutton sheep, in addition to their wool-production, but their flesh is not considered of such fine quality as an edible product.

"The fine-wools, such as the Merinos, are not usually looked upon as mutton sheep, although crossing with middle-wool blood produces a better mutton animal than the pure Merino.

"The down-sheep, proper, are hornless, dark-faced and dark-legged; and the majority have close fine wool, comparatively short in length, and with fleeces of medium weight. The most important economic feature is the quality of the carcass and the mutton. They do not readily become too fat, even when fed to great weights, and the mutton is of superior quality, being firm, fine in the grain, and rich in color.

Fine Wool vs. Mutton Breeds

"Referring for a moment to the fine-wools or Merinos, as wool-producers they are famous. The mutton qualities, however, are inferior, the sheep being muscular in type, carrying but little fat, and considered of about secondary importance in this respect. The cross-bred, or grade American Merino, is not improved for wool-production, but, as already stated, when crossed with middle-wool blood, a better mutton sheep is produced, although yielding less wool.

"The mutton value of the Delaine Merino has been emphasized for some time; but it does not dress out so well as the true mutton type of sheep. The cross-bred or grade Delaine seems to be valued on the range."

"The Rambouillet, which is of Spanish origin, although a native of the northwestern part of France, is a member of the great Merino family. As a mutton producer, this breed ranks well, but is inferior to the regular mutton breeds. Cross-bred and grade Rambouillets are well known on the Western ranges."

There is perhaps no universally best breed. Some breeds do well in some places, while others do better in other places. Some farmers have wonderful success with particular breeds, and almost fail with others. The particular breed that one selects must be largely a matter of individual choice.

Cross Breeding

Joe Wing found that when Merino ewes were crossed with good Down breeds, the result was good, but was best only when the ewe stock was kept pure Merino. In cross-breeding it is well to remember that the ram is just half the flock—and by far the easiest half to care for. Oxfords, Shropshries, Dorsets, Southdowns and Hampshires cross well on the Western ewes, and make rapid growing lambs. The question of cross-breeding deserves much study, and will be found more successful on the farm than on the range for the reason that conditions and environment can be more easily controlled on the farm.

In the Mating Season The following suggestions are quoted from Illinois Extension Circular No. 17.

(a) Have the ewes in a gaining condition.

(b) Shear the ewes around the rear parts, and see that the dung does not collect there.

(c) Dip the ewes and the ram if ticks, lice, or scab mites are present.

(d) Feed the ram a pound of grain each day. Grain should be fed to ram before mating begins.

(e) Use one ram to every thirty-five to fifty ewes.

(f) Keep a record of the time when the ram is turned in with the ewes and when taken away.

During Pregnancy The period of pregnancy is 146 days and the following will be found a useful guide:

(a) Have the ewes gain 15 to 25 pounds.

(b) Utilize cheap roughages.

(c) Feed grain and leguminous hay during the months of pregnancy.

(d) Shelter the ewes from cold rains and storms.

(e) It may be advisable to divide the ewes into groups relative to age, condition, or time of lambing.

Suggestions for Lambing Time Most of the following suggestions are taken from Extension Circular, No. 18, University of Illinois, by Prof. W. C. Coffey, which contains much valuable information on handling the flock at lambing time.

The shepherd should keep watch over the flock at lambing time. Keep the ewes that are about to drop lambs separated from other kinds of live stock—and do not forget that hogs will eat young lambs.

Provide warm quarters in cold weather and give ewes plenty of room. Have a few portable lambing pens, about four feet square.

A First Aid Outfit It is suggested that the following should be kept on hand for treatment of ewes and lambs:

1. Liquid sheep dip to be used as a disinfectant.
2. Epsom salts, castor oil, and raw linseed oil to be used as physic.
3. Tincture of iron, gentian and ginger to be used as a tonic.
4. Soap to place in water intended for injections to relieve constipation.
5. Tincture of iodine to be used on swollen udders and on navel cords to prevent "navel ill."
6. Swan-bill nipples for feeding milk to young lambs.
7. A metal syringe provided with a large nozzle and also a small one suitable for giving injections to young lambs.
8. A glass graduate for measuring doses of medicine.

Caring for the Ewe As lambing time approaches, pen the ewe at night where she can be watched till the lamb is a few days old.

It must be kept in mind that the ewe frequently requires help when giving birth to lambs. If help is given, great care should be taken to disinfect the hand—and do not tear the parts of the ewe.

If the ewe seems to have no appetite six or eight hours after the lamb is born, raw linseed oil and epsom salts should be given. Two ounces of oil and four ounces of salts make a good physic. A teaspoonful of gentian in half pint of warm water three times daily makes a good tonic.

Caring for the Lamb See that the lamb finds the teat, and if it is strong nothing more is necessary. A weak lamb should be helped till it is strong enough to find its food.

If the lamb is disowned, confine it and its mother in a close pen, and smear some of the mother's milk on the lamb. Twins should always be put with the ewe both at the same time.

Marketing Mutton and Lamb

What are the Market Demands

During the past few years there has been a remarkable change in the sheep business. "Aged stock" has become very scarce. Livestock men now market practically all of their stock as lambs. This has resulted almost in the elimination of wether sheep and yearling ewes. Receipts of "aged stock" are now almost all ewes, and even these at times are very scarce.

Early Spring or Hothouse Lambs

The trade calls for light, plump, well finished lambs, weighing about 70 to 80 pounds on the hoof, and mutton weighing 100 to 125 pounds. The sale of poorly finished carcasses is very slow—but the demand is always heavy for good stock. In this country few of our wethers are above three years old when they are taken to market. We are a lamb-eating people, but will eat mutton when lambs are not available.

The first run of spring lambs usually comes just before Easter. These are often termed "hothouse lambs" and are the output of growers who specialize on early lambs. They are generally dressed with the pelts on.

These are lambs that are dropped in November or December and prepared under artificial conditions for market.

The idea in raising hot-house lambs is to bring them on the market in early spring and get fancy prices for them. For a limited supply of these lambs there is a good demand. They average about fifty pounds on the hoof, which is considered very light as lambs go.

Spring Lambs

The first real run of genuine spring lambs on the western markets is from Tennessee. The start in limited quantities about the middle of May, and come regularly after June first.

They are pasture lambs and usually come from the South where pastures are green very early in spring, and where lambing time is somewhat earlier than farther north. These lambs may be fed grain with profit, even though they have plenty of rich pasture. In this way they can be quickly finished for market from April fifteenth to June first while prices are high. To get the best results with them, the ewes may be fed some grain but should receive cotton-seed meal and some hulls, and with these a light sprinkling of shorts.

These Tennessee lambs are followed by Kentucky lambs during July, and the Central States Natives and western range lambs from July fifteenth to about November first.

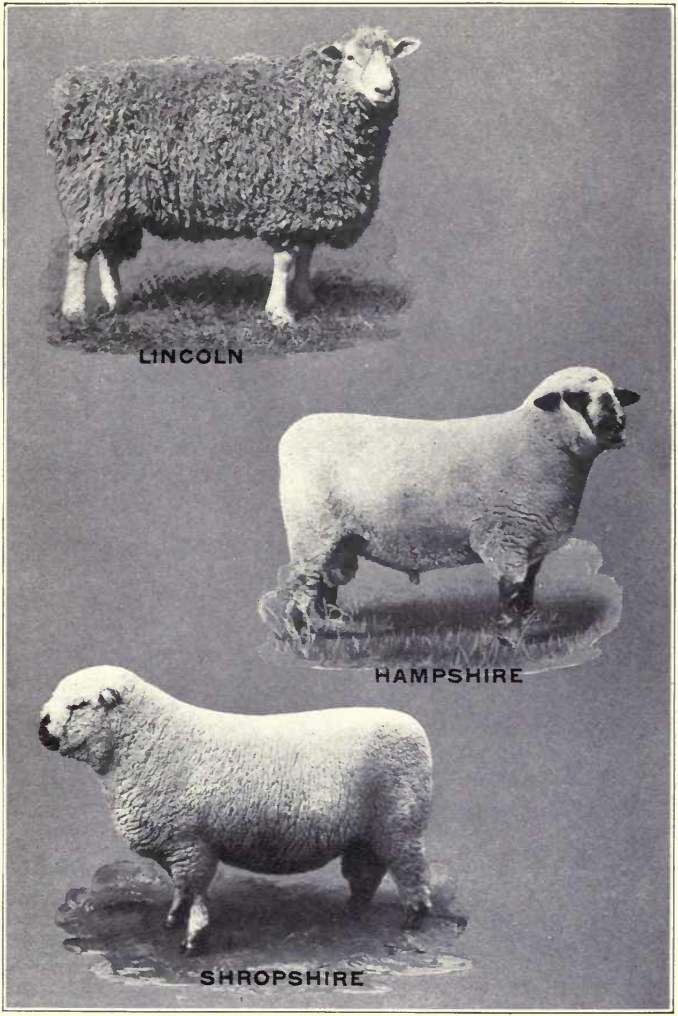
Fed Lambs

These are the grain fed spring lambs that run from about November first to June first. They are mostly range-bred stock that has been moved east during the fall and handled by feeders.

The time required to finish these lambs depends upon the time that they are put on special feeds and the nature of the feeds used. Different feeds are used in different parts of the country. In some sections like Colorado where hundreds of thousands are finished for market, feeding is almost a profession. The practice there hinges on the rich alfalfa crops and the pea fields in the Arkansas Valley, the grains and other concentrates being shipped in. In Idaho, Montana and other western states, lambs are frequently kept over and finished during the fall and winter months on hay. In the middle west and further east, various kinds of feed combinations are used as suggested in the chapter on feeding. Soy-bean meal, shorts, corn meal, and various other concentrates, combined with some hay and clover or alfalfa, constitute the bulk of such feeds. In feeding for market farmers should exercise judgment for the reason that greatest profits are always made by judicious feeding.

Imported Sheep and Lambs

For several years past frozen sheep and lambs have been imported from South America, Australia and New Zealand. Although the American trade is unused to handling frozen stock, these imported sheep and lambs have met with a ready sale and given entire satisfaction.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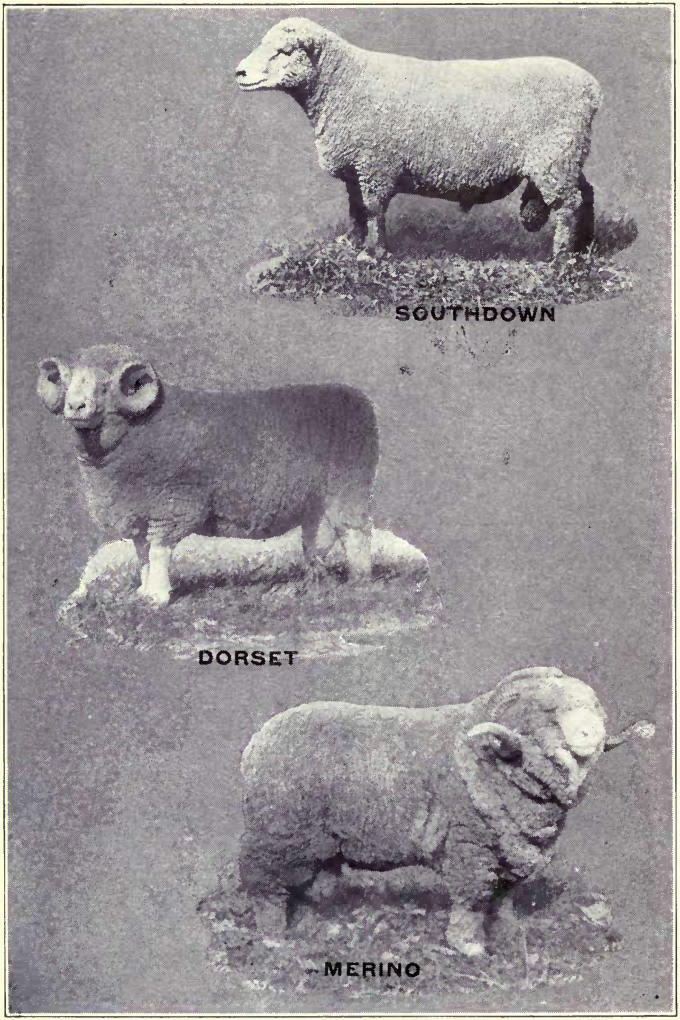
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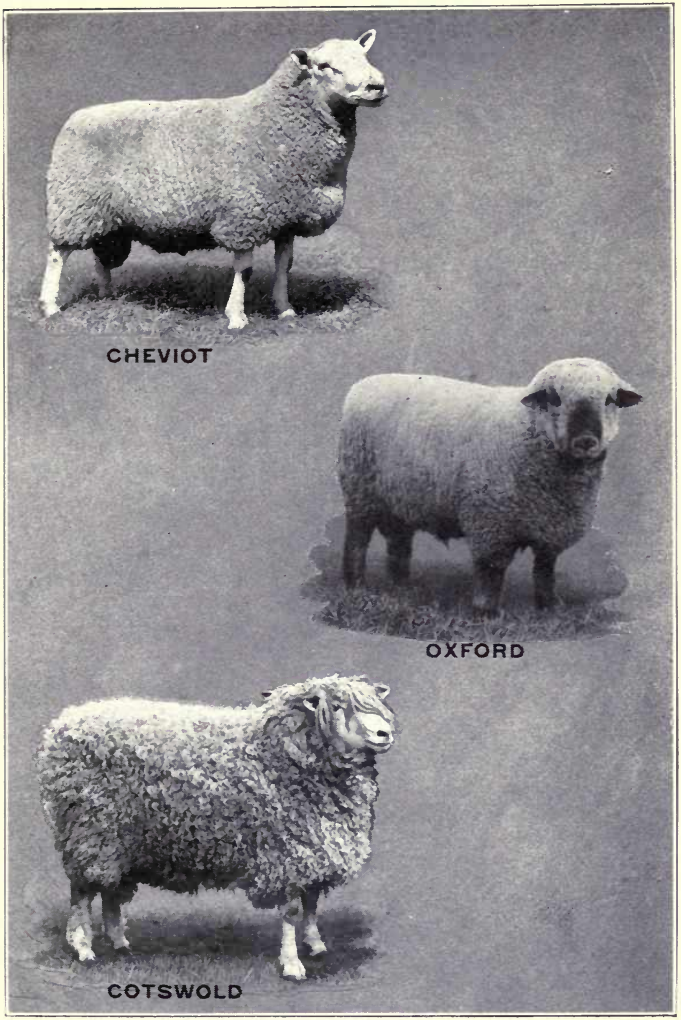
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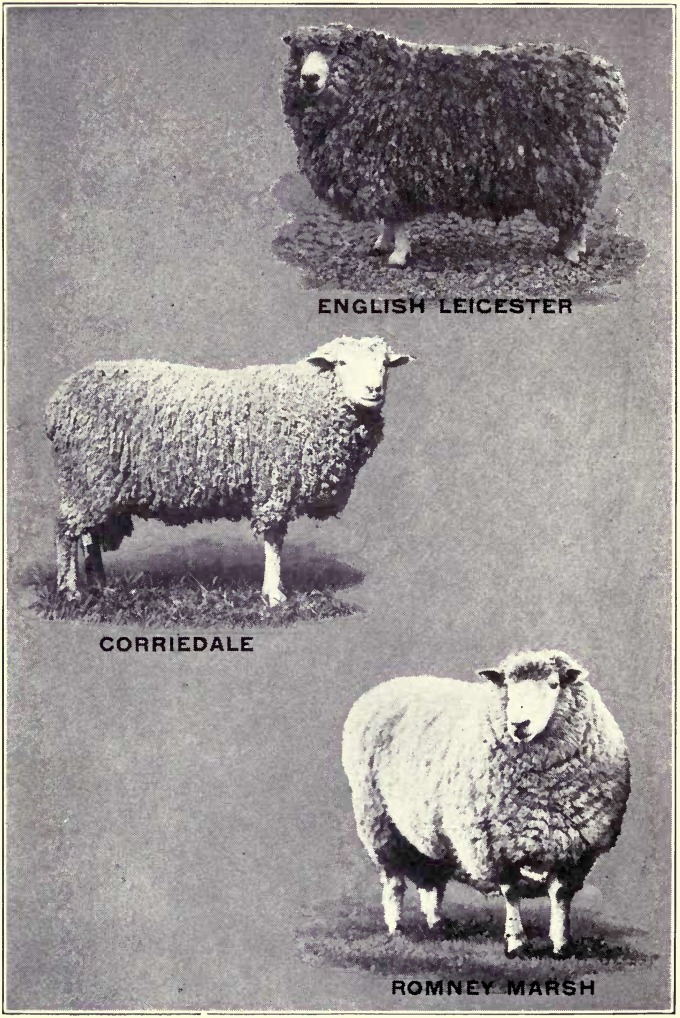

ENGLISH LEICESTER
CORRIEDALE
ROMNEY MARSH

The Feeding of Sheep

IT WILL be impossible to give a complete treatise on feeding in this booklet, but we feel justified in including some of the experiments and opinions of the best feeders.

Sheep respond readily to good treatment. They clean up the weeds about the farm, and graze pastures and ranches, closer than other animals. They thrive with very little attention, but pay handsomely for the best care.

Sheep that are raised on the large western ranges are usually fed lightly and only in winter except when they are being finished for market; in fact, it is not necessary to feed them in grazing season except to keep them tame and under control. They are primarily grazing animals and do best when they have free range.

Feeding Ewes

The ewes should be flushed just before breeding time in order to secure the best results. If on the farm, they can care for twin lambs, and are more apt to drop twins if well fed prior to breeding.

They do not need very high feeding during winter. An abundance of forage, a half-pound of mixed grain feeds, and two or three pounds of silage or root crops daily per head will be sufficient.

The most important part of the flock of sheep is the breeding ewes, and if we once learn to care for these we have solved most of the difficulties of the business. In selecting feeds a formula should consist of some alfalfa and other legume hay, such as clover, cow-peas or velvet beans.

At Lambing Time

Do not feed grain two or three days prior to, during and immediately after lambing time. There is danger of milk fever. Legume hay or other dry roughage and silage or mangels can be fed with safety all through

the period of gestation and these may be supplemented with small quantities of grain a few days after lambs are dropped. Within a short time a full feeding of grain is possible without injury, if the quantity is very small at first and the increase gradual.

The best paying feature of the sheep industry is the quick sale of fat lambs. Much study and attention therefore should be given to the subject of feeding lambs.

Begin Feeding at Ten Days

They very early develop an appetite for solid feeds, and will begin to nibble weeds and grass when only a few days old. Feeding may begin with safety at ten days of age, and should be done for the reason that a pound of flesh can be produced now much cheaper than when the lamb is older. Besides, too long delay will make it harder to put on flesh. In England, and more recently in this country, the custom has been developed of constructing creeps or small openings through which lambs can pass, but which keep back the ewes.

These permit lambs to go into special inclosures where they can have extra attention. They should begin to use grain as early as they can with a degree of safety, which is about two or three weeks after birth. Other facts regarding the feeding of lambs are pretty well known, or can readily be learned from the many excellent books available, including state and Government bulletins.

Healthy Lambs Economize Feeds

Healthy lambs make good use of every ounce of feeds that go into them, and while they are young is the time to plan and feed for marketing. Delay is costly. Every farmer knows that it is good business to use feeds where they count for most, and grown sheep cannot make as good use of feeds as lambs.

Experiment has shown that to produce a hundred pounds of lamb flesh it was necessary only to add one of the following to the milk and grass diet:

71 pounds of wheat bran
or 74 pounds of corn meal
or 78 pounds of oats
or 81 pounds of crushed peas.

Feeding for Breeders or for Market

Unweaned lambs that are to go to the breeding flock at maturity should receive oats, bran and peas, while those that are to go to the slaughter pen should receive corn. The corn produces a fat carcass and one better suited for market demands.

Gains from Different Grains

The rate of gain from the different feeds is given by Woll in the following quotation:

"When alfalfa is used alone it requires 110 to 120 days to fit lambs for market; with light grain feeding (one-fourth pound per head per day) 100 to 110 days; with medium grain ration (one-half pound), 90 to 100 days; and with heavy grain ration (one pound), 70 to 80 days."

He states that one-fourth pound a day of corn made as much gain as one-half pound, but that the gain was not so rapid.

Rations worked out by Experiment Stations

In Henry's Feeds and Feeding (page 528) are given a number of results from the various experiment stations in rations for fattening lambs. The tables show how much rations should be given each day to a hundred lambs. They also show the weights of the lambs that were fed and the average daily gain resulting from the feed combinations.

Rations for Fattening Lambs

At various Stations different feeding stuffs and combinations of feeds have been used for fattening purposes. Examples are here presented to aid the feeder in forming satisfactory combinations of grain and roughage and to guide in determining the quantities required. In all cases the rations are calculated for 100 head. The weight of the lambs is given in each example:

Michigan Experiment Station.[1]
Corn and clover hay.

	Lbs.
Av. wt. of lambs fed...	82
Daily gain.....	.31
Shelled Corn.....	149
Clover Hay.....	104

Wisconsin Experiment Station.[2]
Corn and Corn fodder

	Lbs.
Av. wt. of Lambs fed...	76
Daily gain.....	.27
Shelled corn	154
Corn fodder	188

Michigan Experiment Station.[1]
Corn, oil meal and clover hay.

Av. wt. of lambs fed...	83
Daily gain.....	.34
Corn.....	132
Oil Meal.....	33
Clover Hay.....	110

Michigan Experiment Station.[1]
Corn, bran and clover hay

Av. wt. of lambs fed...	80
Daily gain.....	.25
Shelled corn	81
Bran.....	81
Clover hay	107

Michigan Experiment Station.[3]
Corn, Wheat and clover hay.

Av. wt of lambs fed ...	85
Daily gain.....	.25
Shelled corn	64
Wheat.....	64
Clover hay	129

Wisconsin Experiment Station.[2]
Corn, oats and hay

Av. wt. of lambs fed...	89
Daily gain.....	.38
Shelled corn	94
Oats.....	94
Hay.....	95

Wisconsin Experiment Station.[2]
Corn, peas and corn fodder.

Av. wt of lambs fed ...	76
Daily gain.....	.32
Shelled corn	87
Peas.....	87
Corn fodder	183

Michigan Experiment Station.[4]
Oats, hay and roots

Av. wt. of lambs fed...	83
Daily gain.....	.31
Oats.....	164
Clover hay	140
Ruta-bagas.....	100

[1] Bul. 113. [2]Rept. 1896. [3]Bul. 128. [4]Bul. 107

Minnesota Experiment Station.[1]
Wheat screenings and timothy hay

	Lbs.
Av. wt. of lambs fed...	74
Daily gain.....	.29
Wheat screenings.....	211
Timothy hay.....	72

Minnesota Experiment Station.[1]
Barley, oil meal and timothy hay

Av. wt. of lambs fed...	76
Daily gain.....	.33
Barley.....	170
Oil meal.....	19
Timothy hay.....	72

Texas Experiment Station.[2]
Cotton-seed meal and cotton-seed hulls

	Lbs.
Av. wt. of lambs fed...	62
Daily gain.....	.28
Cotton-seed meal.....	97
Cotton-seed hulls.....	97

Colorado Experiment Station.[3]
Cracked corn and alfalfa hay

Av. wt. of lambs fed...	89
Daily gain.....	.29
Alfalfa hay.....	290
Corn.....	67

Barley, oats and corn were the cheapest concentrates in the growth of market lambs. Barley is easy to grow and sufficient attention has not yet been given to it in this country as a food for sheep. It is especially good in climates where winter wheat is likely to be winter killed.

Calculating Feeding Costs

In order to calculate the exact cost of producing a hundred pounds of live weight, one has only to refer to the daily papers and see the price of the materials he is selling, or to be even more practical, calculate the price of feeds by the prices we are getting on the market. The legal weight of grains is different in different states, but the following is accurate enough for practical purposes:

Corn in ear	70 lbs. per bushel
Corn shelled	56 lbs. per bushel
Corn meal	48 lbs. per bushel
Wheat	60 lbs. per bushel
Barley	48 lbs. per bushel
Rye	56 lbs. per bushel
Oats	32 lbs. per bushel

[1]Bul. 113 [2]Rept. 1896 [3]Bul. 128

How to Fatten Sheep

Woll, in Productive Feeding of Farm Animals (Lippincott), gives a series of formulas to be used in combination for finishing sheep for market, and they are so good and so representative that we reprint them here, giving them in the order in which we find them. The amounts are to be given daily to each animal weighing about one hundred pounds at the beginning of the finishing period:

1. Two pounds clover hay, one pound wheat bran, one and a half pounds corn.

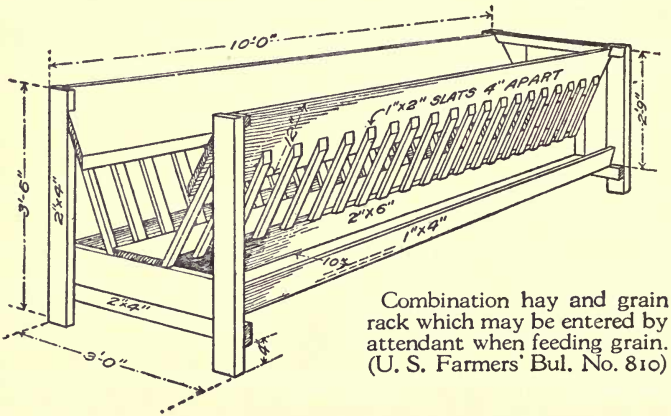
2. One and a half pounds of hay, one and a half pounds roots, one and a half pounds of oats and wheat bran, equal weights.

3. One and a half pounds clover hay, one pound roots, one pound corn, one-half pound wheat bran.

4. Three pounds alfalfa, two-thirds pounds corn.

5. One pound each cotton seed hulls and cotton seed meal.

6. One and a half pounds clover hay, one pound corn, one-quarter pound wheat bran, one-half pound gluten feed.



Combination hay and grain rack which may be entered by attendant when feeding grain. (U. S. Farmers' Bul. No. 810)

7. Two pounds alfalfa hay, two pounds ground corn and oats.

8. Two pounds clover hay, one and a half pounds soy beans, one-quarter pound wheat bran.

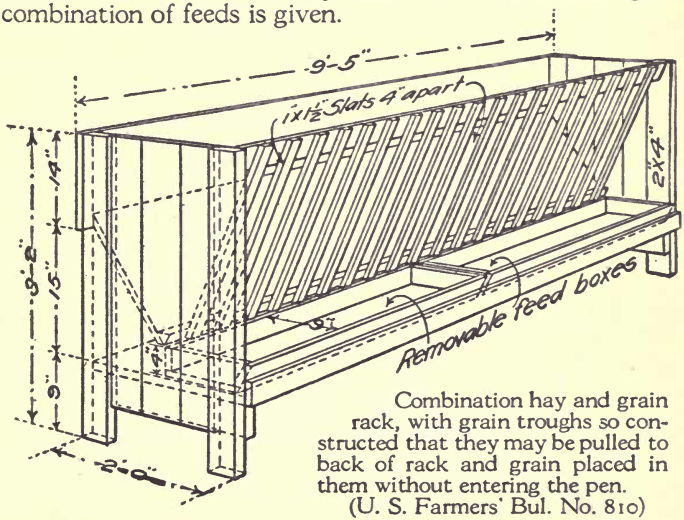
Substitute Barley for Wheat

These combinations can be mixed in large quantities for flocks, and then given out by totals—the number of pounds to each sheep multiplied by the number of sheep to be fed.

Barley makes a good substitute for oats or wheat in any one of the combinations, and may also be used in the place of corn.

Barley is easily grown in the more northerly climates and is sure to come into more general use as a feed. It can be planted in spring and the crop is to be counted on.

Any farmer can take these combinations and alter them to suit his own locality and finish sheep for market with no risk whatever. It is only a matter of care if the right combination of feeds is given.

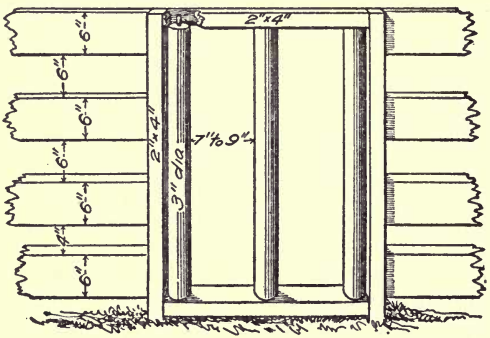


Combination hay and grain rack, with grain troughs so constructed that they may be pulled to back of rack and grain placed in them without entering the pen. (U. S. Farmers' Bul. No. 810)

The owner of a flock of sheep can do nothing more important than to make a study of these feed combinations and adjust them to suit his own climate and crop conditions. Success is sure to follow a careful and accurate observance of these results.

The Wool Pays Feed Bill When sheep are properly cared for it is estimated by western sheep breeders and feeders that the wool pays for the feed and the carcass is clear profit. This estimate is based on the assumption that the flock receives the proper attention from the dropping of the lambs to time for marketing.

Self Feeders Should not be Used Sheep breeders often inquire about self feeders for sheep. We cannot urge too strongly that farmers should not use self feeders. The death rate is far higher and the gains are never as satisfactory.



Lamb creep with rollers for uprights.
(U. S. Farmers' Bul. No. 810)

Good Pastures a Basic Crop

THE luxuriance of the pastures of a farm is a measure of its fertility. Pastures are frequently neglected as factors in agricultural prosperity. They should be regarded as a crop, the same as wheat or corn, and made to yield abundantly.

"I cannot spare the space for sheep raising," says one farmer. "I need all my land for money crops."

In the first place, land devoted to pastures, if it is made to yield abundantly, is not "spared." It constitutes a valuable crop which yields a profitable return on the investment, and if it is in leguminous forage, it is contributing, at the same time, to the necessary fertility for future crops. Furthermore, the animals grazing upon it, also contribute to the maintenance of soil fertility.

The reader will no doubt remember John J. Ingalls apostrophe to grass, in which he says:

"Should its harvest fail for a single year, famine would depopulate the world."

The truth of this statement, once impressed upon us, forces us to respect the economic importance of this lowly herb.

What Senator Ingalls really meant was that our live stock could not exist without grass and that we could not exist without the livestock.

Poor pastures should not, and need not be tolerated, but this form of inefficiency is far too common. Losses through poor pastures are very apt to be ascribed to the sheep or other live stock which cannot thrive upon them. Unless sufficient fertility is maintained in the soil to nourish grasses, and the grasses actually raised, sheep cannot be expected to prosper any more than any other crop.

Good Pastures Important

Sheep are naturally grazing animals, and unless they have adequate pastures they will not thrive. We have said before that they eat 90 per cent of all the species of weeds commonly found on the farm. Furthermore, they will clean up the hedgerows and the fence lines. But this should not be taken to imply that they can as well do without better pastures. Sheep deserve and need the best pastures we can make and will thrive in proportion to the quality of forage they get from the pasture.

Value of Native Grass

For sheep, grass should not be permitted to grow too high, however. Sheep need short sweet grasses. Wing says that the wild pasture grasses are best, and should be developed as much as possible. He also says that there are many kinds of pasture plants we can use to advantage, some of which are discussed in the following paragraphs.

Rye Good and Easy to Grow

Rye is a sweet succulent pasture and is easily grown. It is not rich in food value but is very wholesome; and because of the ease with which it can be grown, is popular in all parts of the country. If the spring grain fields are put into winter rye, this will provide good feeding for the flock until time for planting the spring grain crop. Rye can be planted in any kind of waste place with good effect and will always pay for the trouble and cost.

Vetch and Rye

If the land is suitable, hairy vetch can be sown with the rye and the two will make a good food combination in spring. This will make a longer season for grazing and a better food, but cannot be so closely grazed in winter. A good plan will be to put part of the land into rye, and part into vetch and rye, and have a movable fence for a partition.

Alfalfa and Oats

For late spring and early summer grazing, oats and alfalfa are good. Sow these crops on good soil and fertilize well if you would get good results. Sow them early and use liberal quantities of seed, about two bushels of oats and fifteen to twenty pounds of alfalfa seed to the acre.

To graze these crops successfully, let the sheep run on them until eaten down close, then turn into other pastures or rotate with movable fences until a growth of oats and alfalfa gets started again. This can be repeated as often as the pasture is suitable for grazing.

The Clovers

The clovers are among the best pasture crops, first because they are rich in food value for sheep and second, because they enrich the soil they grow on. Sheep that have these for the annual pasture are also less troubled with diseases. They nibble off the upper leaves, and get cleaner food.

These plants, however, are rich in protein and would be too rich if grazed alone. When sown for pasture, orchard grass should be mixed with them. If grasses are to be had the animals will not overeat the richer foods.

Do Not Graze Clover Too Young

Wing observes that pasturing on clover is never absolutely safe, but the observance of a few simple rules will go far to insure safety. Do not graze young clover plants. Wait until they are almost to the blossoming stage. Do not graze hungry sheep on clover. Allow them to get almost filled up on other feeds before putting them into the cloverfield. Give them salt as soon as they are put upon pasture.

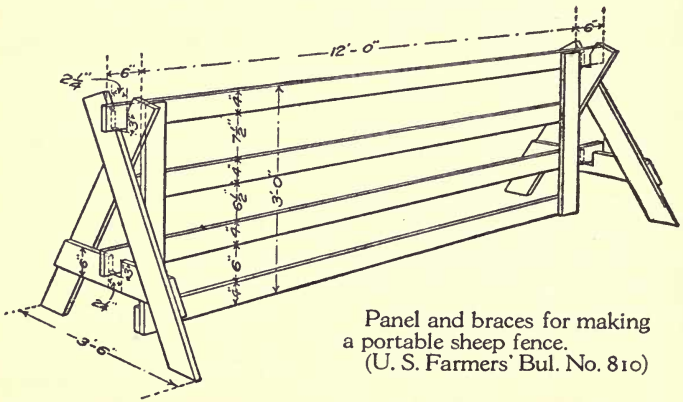
Rape and Cabbage as Feeds

Rape belongs to the cabbage family, all branches of which fit well into the diet of sheep. It yields well in food value compared with other plants, but must be eaten green. Rape is generally better for autumn, and will afford good pasturage after other pastures are gone. Sheep fattened on rape will require some grain to finish them solid. Dwarf Essex is the most popular variety.

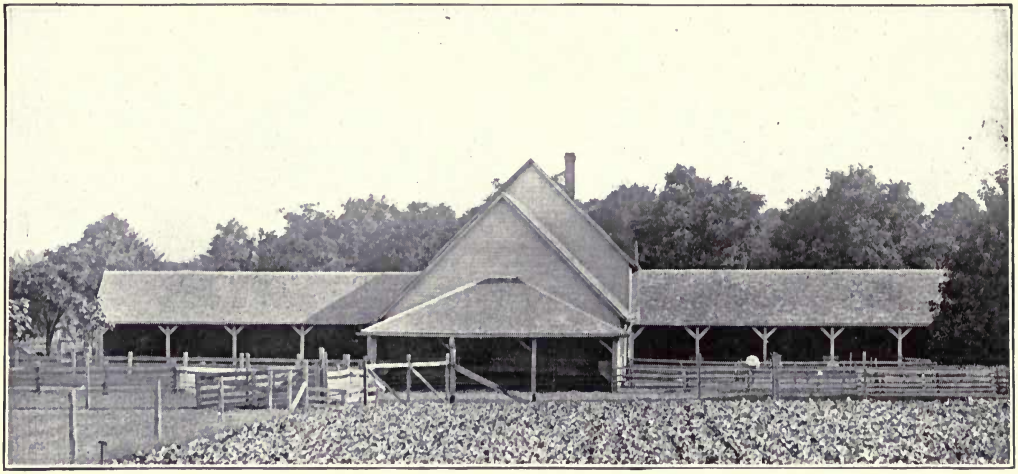
Cabbage makes a good feed, and where it can be grown successfully proves to be a cheap feed. Supplemented with a small amount of grain it will be found useful in getting breeders ready for market.

Trees in Pasture

Every permanent pasture should have a few good shade trees in it for shelter from the sun in hot weather. Few breeders realize how much this means to the flock. Plenty of cool clean water is also important in the pasture.



Panel and braces for making a portable sheep fence. (U. S. Farmers' Bul. No. 810)



Plans for Sheep Barns, large or small, may be found in U. S. Farmers' Bulletin No. 810.

Mechanical Shearing Demonstration, Iowa State Fair, 1917.

General Care and Management

Care of Sheep As has been stated above, sheep are primarily grazing animals and must have pasture if they are expected to make reasonable returns. Open fields are not sufficient. Some permanent grasses must be available.

Suitable houses should be provided, and feeding pens sufficient to give plenty of room without crowding. Plenty of fresh, clean water should be convenient at all times.

The owner should mingle daily with the flock. He must know his sheep and let his sheep know him. Small amounts of feed should be given them daily even when they do not need it. This will keep them in better condition and health and in good training.

Do not forget to salt the sheep often. It will insure better health and greater returns at the market. Some feeders mix salt in with the feeds and find that it pays. Salt is not costly, but many feeders overlook its importance.

Too much attention cannot be given to the flock at lambing time. A slight change in methods of feeding and housing may spell the difference between success and failure. The ewes should be dealt with gently and the lambs cared for from the time they are dropped.

Dogs should be kept away from the flock at this time. Ewes frequently give birth to dead lambs because of fright from dogs.

Culling the Flock All ewes do not pay, and some of them must go to the block. Some of them will prove non-breeding, others poor milkers, and still others light shearers, and any one of these defects will prove sufficient for condemnation. This weeding out process or culling is very necessary in order to build up a paying flock.

It is also well to sell ewes before they are too old for the butcher. For mutton sheep this is usually about the fifth year of their age. After that they are not very profitable as breeders nor well suited for the block.

Shearing

Sheep are kept for wool, even the mutton breeds, and must be sheared once a year just at the opening of summer. The old hand shearing is a thing of the past, except in certain places in the West and in the case of the small farmer who keeps only eight or ten head and does not have access to a mechanical shearer.

F. R. Marshall says: "The tags or dung locks should be removed from the fleece, and then it should be rolled up, not too tightly, skin side out, and tied with paper twine. Wool buyers prefer this method of tying to that done with wool boxes."

Docking of Lambs

Docking is the removing of the tails of lambs and is an operation that every good sheep breeder attends to promptly and without fail. It is essential for lambs that are to be marketed. The tail is only a lodging place for burs, maggots and dirt and is sure to become a dead-weight and a drag upon the vitality of the growing animal. In fact, undocked lambs are discriminated against in the market.

The operation is performed by means of a knife, chisel or hot iron, and should be attended to about a week before the work of castration. Cut the tail off about one inch from the body. Marshall says in Farmers, Bulletin No. 840:

"The lamb should be held with the rump resting on the top of a panel or pen partition, or upon a board if the hot irons are used. When docking with the hot iron the operator should work with the right hand, holding the tail in his left and pushing it toward the body. This will leave loose skin above the cut to close over the wound. Pine tar may be applied if flies are bad."

Castration of Lambs

Castration is an operation in lamb production that is neglected only by the most careless or indifferent sheep raiser. Many uncastrated lambs still find their way to market, but principally from the small farms where up-to-date methods are not followed—never from the large farms or ranches where sheep raising is recognized as a business. These are discriminated against rather severely at times by buyers, whereas if castrated, they would have stood a fair chance of topping the market.

Castrating should be done on a nice day, when lambs are from seven to fifteen days old. The lower third of the scrotum should be cut off and the testicles pulled straight out. If both testicles cannot be felt the operation should be delayed. There should be no further difficulty except in unusual cases. A mixture of tallow and turpentine may be applied to stay off soreness that might otherwise develop. The proportions of tallow and turpentine should be such as to leave the mixture a soft paste or heavy liquid. Only a small quantity should be applied and that immediately to the wound.

The Dog a Great Hindrance

It is estimated that there are about twenty-five million dogs in the United States or one to every four persons, and one for every two sheep. If dogs are properly guarded and kept closed in, they do not prove a menace to the sheep industry, but they are not kept confined as a general thing. Many a farmer who has waste land, and who formerly kept sheep to crop it has actually abandoned sheep raising because he felt that he would rather sacrifice this source of profit than try to cope with the dog nuisance.

Many keepers of sheep have found a real field of usefulness for the trained Collie. We do not go so far as to say that such a dog has no place in our economic scheme, even in times like these, when non-essentials in every form

are being sacrificed to the great objective and in support of the war. What we do urge is the passing of constructive legislation that will protect the few useful dogs as well as outlaw the great majority which do not and cannot serve any economic purpose, and which are a constant liability to the sheep-raising possibilities of the country.

Why Not Have Dog Laws

It would be an easy matter to control this nuisance if public sentiment were in favor of a national dog law, whereby the owners of dogs would be required to pay for all damages done to livestock, but farmers have not yet asserted themselves in a co-operative way and in sufficient number to make their voices heard on this subject in the national capital.

"Only one in seven farms of over twenty acres now supports sheep," says the Secretary of Agriculture in his annual report for 1916, "with an average of one sheep of shearing age to three acres of land."

In proportion as the small farms in any community are stocked with sheep, the obvious necessity for state dog laws will manifest itself, and there is no reason to believe that sentiment in favor of pet dogs will outweigh the practical requirement for more sheep and wool in a time like this. New York State has passed such a law and we are informed it works well in most cases. Complaints have been adjusted in the majority of instances without legal procedure. It would be well for those interested to write to the State Department of Agriculture, Albany, N. Y., and secure a copy of the law.

A Uniform Dog Law

In Farmer's Bulletin 935, United States Department of Agriculture, entitled "The Sheep Killing Dog," we find valuable suggestions for a uniform dog law, which should command the attention of our legislators in the various states. A reasonable tax is suggested, and certain definite legal rights to deal with

dogs known to kill sheep. It requires that all dogs be confined at night. This is a wise provision since it is so well known that dogs do most of their mischief at night.

Sheep Husbandry

A world of sentiment is bound up with the history of the sheep industry. A flock grazing on a hillside is a poem within itself, and it is to be hoped we will never lose the faculty of enjoying this beautiful sight. That modern commerce has helped to eliminate much of this original sentiment from the happy associations of the shepherd and his flock we must admit, but there is no doubt that the shepherd has more enjoyment from watching the flock than any of us can ever have from the busy life as found in our centers of commerce.

Diseases of Sheep

All animals are subject to certain diseases and this fact must be recognized by the owners of sheep. To deal with disease successfully one must keep advised of the latest remedies, and should, from time to time, write to his Experiment Station for such information.

Wing in Sheep Farming in America—page 311 classifies diseases among sheep as follows:

Sheep Diseases Classified

"First, there may be some external parasite, as the tick, louse, scab or foot-rot (which is in a sense an external disease).

"Second, there may be some form of internal parasitism. This may be worms in the stomach or intestines, in the throat or lungs, or encysted worms making a bladder in the brain. And one or another of these internal parasites is the cause of most of the sickness among sheep.

"Last, there may be some derangement of the digestion due to improper feeding, no feeding at all, or gorging with grain. And in some regions, among the class of sheepmen who feed sheep in winter, nearly all diseases are of this origin.

External Diseases

"Now as to the chance of cure: For external parasites cure is easy and cheap. For scab, lice, and ticks there is the dipping bath. Foot-rot is also of rather easy treatment.

"These things are matters requiring timely and prompt treatment and are no cause for alarm whatever except as scab breaks out in the winter time in the middle of the feeding season, when it is costly to dip and the sheep have serious setback therefrom. Indeed, it is not just proper to class these external parasites as diseases, any more than fleas on a dog's back, though they produce disease if left unchecked.

"The matter of internal parasites is much more serious."

Stomach Worms The two most common internal troubles we have to deal with in sheep are the stomach worm and the nodular disease. These are hard to cure, but rather easy to prevent if one goes about it in the right way. The stomach worm is dropped on the pasture in the feces, and in that way scattered through the entire flock. If it once infects a pasture, the pasture should be rotated about every year or two, and necessary remedies applied to clear the flock of the disease.

If the skin about the eyes and mouth is thin and pale and paper-like, the lambs very likely are infested with this worm. The treatment is a tablespoonful each of gasoline and raw linseed oil in about six ounces of cow's milk for a lamb, and half as much again for a sheep. Three doses must be given to effect a cure—one a day for three days on an empty stomach. See Kleinheinz' "Sheep Management," page 111. The rotation of pastures is imperative.

Nodular Disease The nodular disease is indicated by a cough, a drooping head, and thriftless or greaseless wool. Lambs become thin and shiftless, and the ewes lose weight and fail to respond to feeds. Medicines are not effective and cleanliness and rotation are necessary together with a thinning of the flock till all the disease is gone.

Treating Internal Diseases *Constipation* is indicated by straining and distress in the attempt to pass feces, or dung. Injections of lukewarm, soapy water should be given, and it will help if a tablespoonful of castor oil or milk of magnesia (hydroxid of magnesia) is given.

White scours in lambs are caused by digestive disorder which usually result from mistakes in feeding the ewe, and hence are to be avoided largely by giving the ewe clean, wholesome feed and not changing the ration ab-

ruptly. A lamb having white scours should be taken from the ewe and allowed only a little of the milk. This can best be accomplished by milking the ewe out before letting the lamb nurse. Milk of magnesia given as suggested for constipation will help to correct the disorder.

Acute Indigestion sometimes seizes young lambs. It is marked by great distress and frothing at the mouth. Castor oil (a tablespoonful) is a good remedy.

For Sore Eyes put a drop or two of a 16-per cent solution of argyrol in the eyes once each day. This should be done with an ordinary medicine dropper.

Navel Ill should be avoided by dipping the navel cord in a cup of the tincture of iodine soon after the lamb is born.

For Scabs or Poc-like Sores on the lips and nose, apply a fairly strong solution of sheep dip after the sores have been rubbed open.

Dipping

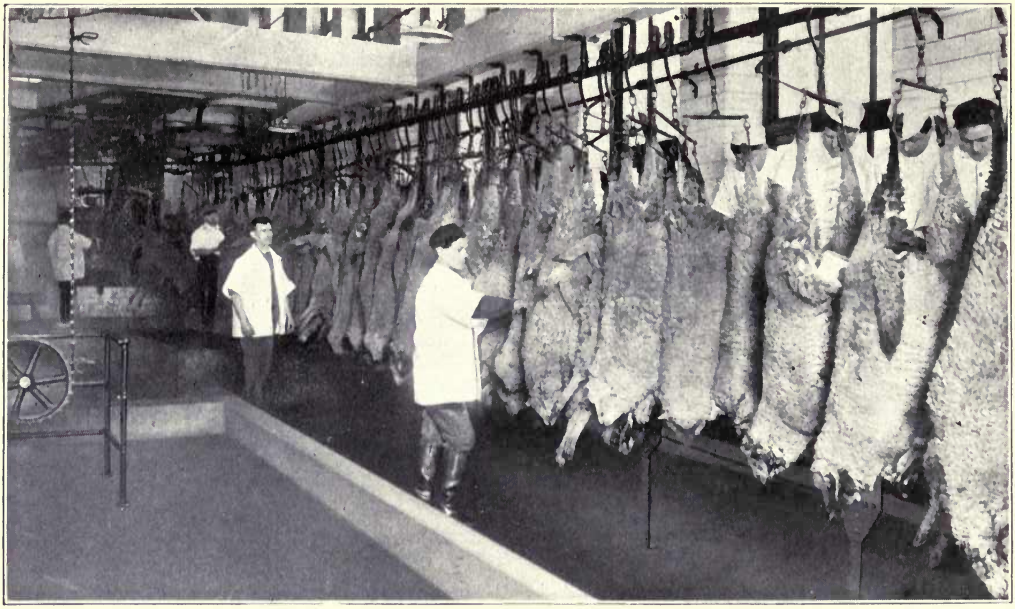
Sheep, like other domestic animals, become infested with vermin—lice, ticks and other skin parasites—and must be constantly looked after.

They should be dipped very soon after they have been sheared. Marshall says they should be dipped on the morning of a fair warm day. Sheep are delicate animals and will develop cold if they lie down at night wet and cool. Any standard dipping solution can be used as per directions given with the material.

If the sheep have ticks they may require two dippings. The second should come about a month after the first.

Avoid Bloating

If sheep are allowed to graze too freely on alfalfa, they are apt to bloat, which often proves fatal. They thrive on pastures of native grass with heavy sprinkling of weeds or lespedeza and burr clover in more southern climates.



The new Armour Sheep-killing Building at Chicago is the largest of its kind in the world. There are lockers and shower baths for workers and forced ventilation.

VIEWS IN THE WOOL DEPARTMENT.

Sheep and lamb skins go to the wool house for cleaning, treating and pulling. Wool from 16,000 skins in a single day is the record of one of our wool houses. The high mark for a single week is 85,000 skins. The wool goes to cloth manufacturers, the skins to the tanneries, the waste and trimmings to the glue works.

By-Products of the Sheep

THE inedible by-products of the sheep, as completely utilized by Armour and Company, are more valuable than those of either the steer or hog, considering their proportion to the carcass.

Sheep pelts, of course, come first in value. This includes the wool, which is valued not only for its fineness, but also for its length.

Sheep skin is more generally used than any other one class of leather. It is used in shoes almost as much as calf. Chamois skins are today entirely made of sheep skin. The leather is used for bookbinding exclusively, for gloves, hatbands, suit cases, and a wide range of other articles.

In the Armour wool houses the full length of the wool is saved by taking it out, roots and all, by means of chemicals instead of by shearing.

This wool is hand sorted according to length, fineness and color into more than fifty grades. It is then scoured to remove dirt and grease, after which it is dried, baled and sold as "scoured pulled wool" direct to manufacturers.

In the process of scouring lanolin is obtained. This is a fatty substance largely used in face creams and ointments because of its soothing effect on the skin.

Musical strings, clock cord and surgical ligature for sewing up wounds, as well as casings for little sausages, are made exclusively from the intestines of the sheep. There is no such thing as catgut violin string, that being merely an arbitrary name for the product of the sheep.

Suprarenalin, the active principle of the suprarenal gland, just above the kidney, is extensively used in medicine. More than 130,000 sheep are required to make a pound.

Pancreatin, another medicine, is made from the pancreatic gland, and still another from the mammary glands.

The thyroid gland (seat of goitre in humans) yields an important medicinal product.

A class of oleo oil is made from the better grade of mutton tallow, and enters into the manufacture of oleomargarine.

Inedible greases are used in soaps. An important by-product of soap-making is glycerin, which is in great demand for the manufacture of nitro-glycerin and other explosives and war munitions. The blood, dried and ground, makes calf feed and fertilizer. Hide trimmings make glue. Bones and other waste make tankage and fertilizer.

The complete utilization of all by-products of the sheep and other meat animals has been found practicable only in the largest packing plants, and is one of the triumphs of large-scale operation. It is made possible by two considerations—the comparatively recent development of large-scale refrigerative control of highly perishable by-products and the enormous volume of those by-products handled.

This wholesale utilization of by-products brings about a number of important economic results of benefit to the whole country, among which may be mentioned:

1. The increased price which the packer is able to pay the farmer for his sheep and other live stock;

2. The more uniform and perfect meat which the large packer is able to sell the local butcher at a lower cost than that at which he could buy and kill it locally for himself; and

3. The employment of thousands of persons in the manufacture of these by-products, many of which would otherwise be discarded as of no value by the farmer himself or local butchers, who are even yet throwing them away as of no commercial value.

Table of Receipts at Seven Markets

In Round Numbers at Chicago, Kansas City, Omaha, St. Louis, St. Joseph, Sioux City and St. Paul for 1917 and 1916.

Months	1917	1916	Gain	Loss
January	965,900	922,200	43,700	.....
February	834,800	877,500	42,700	.....
March	801,300	755,900	45,400	.....
April	675,500	652,500	23,000	.....
May	477,800	693,100	.....	215,300
June	516,300	722,400	.....	206,100
July	572,600	706,100	.....	133,500
August	726,000	1,109,600	.....	384,600
September	1,259,000	1,500,900	.....	241,900
October	1,449,600	1,723,200	.....	273,600
November	853,300	1,059,600	.....	196,300
December	879,000	919,800	.....	40,800
Totals	10,011,100	11,642,800	.....	1,631,700

Table Showing Range of Lamb Prices

At Chicago During 1917 for Native, Western and Colorado Lambs, as Compiled by the Chicago Drovers Journal.

Months	Native	Western	Colorado
January	$10.50 to $14.25	$ 9.50 to $14.45	$13.00 to $14.35
February	11.00 to 15.00	10.00 to 14.90	13.50 to 14.90
March	9.75 to 15.00	9.25 to 15.70	11.50 to 15.50
April	10.00 to 16.25	9.00 to 17.25	10.25 to 17.40
May	10.00 to *19.00	10.00 to *19.00	12.50 to *20.60
June	9.00 to 17.00	10.00 to 16.75	11.00 to 18.50
July	9.00 to 16.50	13.00 to 15.85	.....
August	9.00 to 17.10	14.00 to 17.75	.....
September	11.00 to 18.35	16.75 to 18.60	.....
October	12.00 to 18.60	13.50 to 18.55	.....
November	12.00 to 17.40	13.00 to 18.00	.....
December	12.00 to 17.00	11.00 to 17.10	.....15.75

*Record Prices.

List of Officers of the Various Sheep Breeders' Associations

MERINO—Fine wool breeds of related ancestry, but different development. American Merino, Delaine, Rambouillet are best known breeds or strains. All Merinos produce short wool of fine quality, and all are "wrinkled" where the loose skin is bent into folds. American and Delaine-Merino Association, S. M. Cleaver, Secretary, Delaware, Ohio; American Rambouillet Sheep Breeders' Association, Dwight Lincoln, Secretary, Marysville, Ohio.

SOUTHDOWN—Small sheep of mutton type. Mouse brown and gray markings, good feeders, middle wool class, popular. American Southdown Breeders' Association, F. S. Springer, Secretary, Springfield, Ill.

SHROPSHIRE—Mutton type, middle wool class, black nose and legs, larger than Southdown. Prolific, good feeders, good toppers. American Shropshire Association, J. M. Wade, Secretary, Lafayette, Ind.

OXFORD DOWN—Much like Shropshire in appearance and general utility; larger. Brownish gray markings. Oxford Down Record Association, W. A. Shafer, Secretary, Hamilton, Ohio.

HAMPSHIRE DOWN—Mutton type, middle wool class. Black face and legs. Smaller than Oxford, larger than Shropshire, The American Hampshire Sheep Association, C. A. Tyler, Scretary, 36 Woodland Avenue, Detroit, Mich.

DORSET—Medium size, mutton type, horned, prolific, hardy. Good for early lamb production. Continental Dorset Club, Edith Chidester, Secretary, Mechanicsburg, Ohio.

CHEVIOT—Good mutton breed, medium size. Distinctive appearance with snow-white head and legs. American Cheviot Society, Edward A. Standford, Secretary, Cooperstown, N. Y.

LEICESTER—Large, long-wool breed. Leicester Breeders' Association, A. J. Temple, Secretary, Cameron, Ill.

COTSWOLD—Large, long-wool breed, curly fleece. American Cotswold Association, F. W. Harding, Secretary, Waukesha, Wis.

LINCOLN—Long-wool breed. Largest of all English breeds. National Lincoln Sheep Breeders' Association, Bert Smith, Secretary, Charlotte, Mich.

ROMNEY MARSH or KENT—Long-wool breed, but not so well known as many of the other long-wool breeds. This breed is adapted more to lowlands, and is said to resist especially the foot rot so common among most breeds when grazing wet lands The wool is long and soft and the yield high. It ranks well as a mutton type. Romney Marsh Association, Mark Havenhill, Ames, Iowa.

CORRIEDALE—May be classed as a long-wool breed. Was developed in New Zealand from the Lincoln-Merino crosses, and is intermediate between these two types. Smaller than the Lincoln and larger than the Merino. The wool is long and silky. Has great promise as a dual purpose sheep. American Corriedale Association, M. R. Johnston, Secretary, Wheatland, Wyoming.

REFERENCES

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"The Sheep Tick and Its Eradication by Dipping," Farmers' Bulletin No. 798.

"Equipment for Farm Sheep Raising," Farmers' Bulletin No. 810.

"Farm Sheep Raising for Beginners," Farmers' Bulletin No. 840.

"Breeds of Sheep for the Farm," Farmers' Bulletin No. 576.

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For Sale by the Superintendent of Documents, Government Printing Office, Washington, D. C.:

"The Management of Sheep on the Farm," Department Bulletin No. 20—Price 10 cents.

"Domestic Breeds of Sheep in America," Department Bulletin No. 94—Price 25 cents.

"The Wool Grower and the Wool Trade," Department Bulletin No. 206—Price 15 cents.

"Features of the Sheep Industries of United States New Zealand, and Australia Compared," Department Bulletin No. 313—Price 10 cents.

"Our Present Knowledge of the Distribution and Importance of Some Parasitic Diseases of Sheep and Cattle in the United States' Bureau of Animal Industry Circular No. 193—Price 5 cents.

BOOKS ON SHEEP

"Productive Sheep Husbandry" Includes a full account of the breeds. W. C. Coffey (Lippincott)

"Western Live Stock Management," E. L. Potter, Oregon (MacMillan & Company). 120 pages on sheep—Good on range conditions.

"Judging Live Stock," John D. Craig (Kenyon Printing & Mfg. Co., Des Moines, Ia.) Twenty-five pages on Sheep—very good.

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(American Sheep Breeders, Chicago).
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